

April 8, 1924:

1,489,251

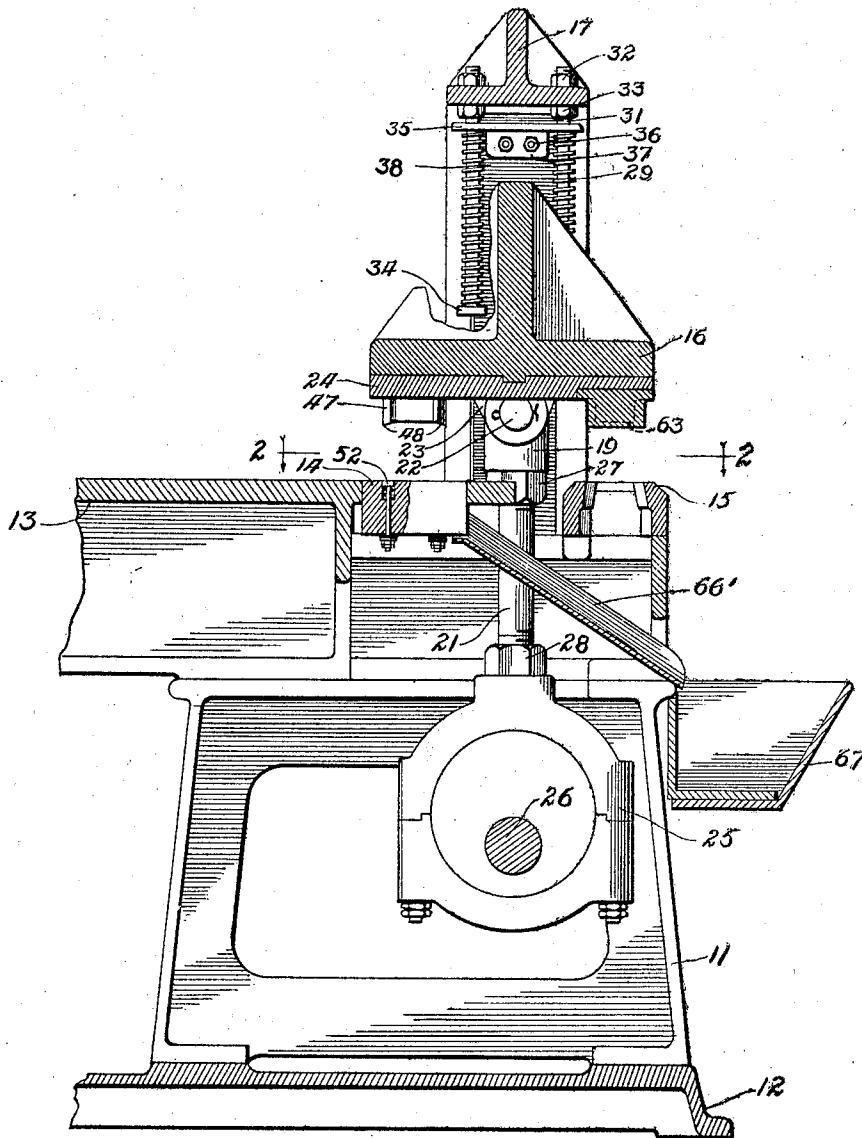
J. M. HOTHERSALL

BLANK SHEARING APPARATUS

Filed Dec. 23, 1921

3 Sheets-Sheet 1

Fig. 1



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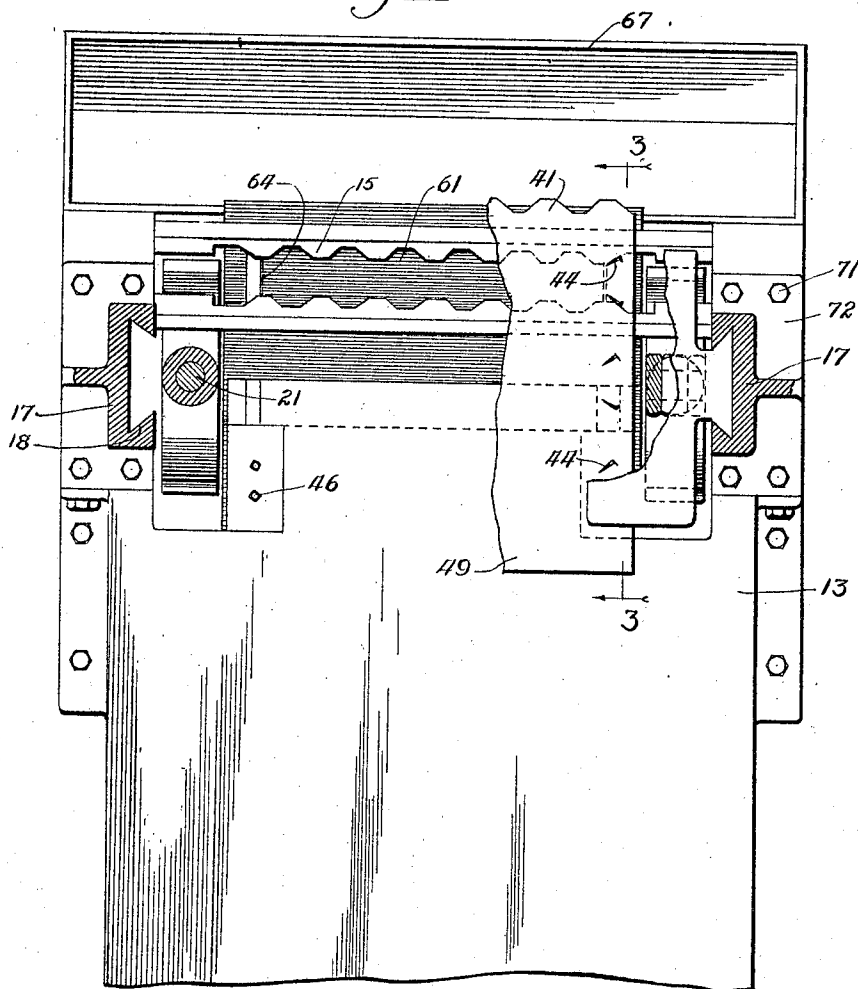
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3 Sheets-Sheet 2.

Fig. 2



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3 Sheets-Sheet 3

Fig. 3

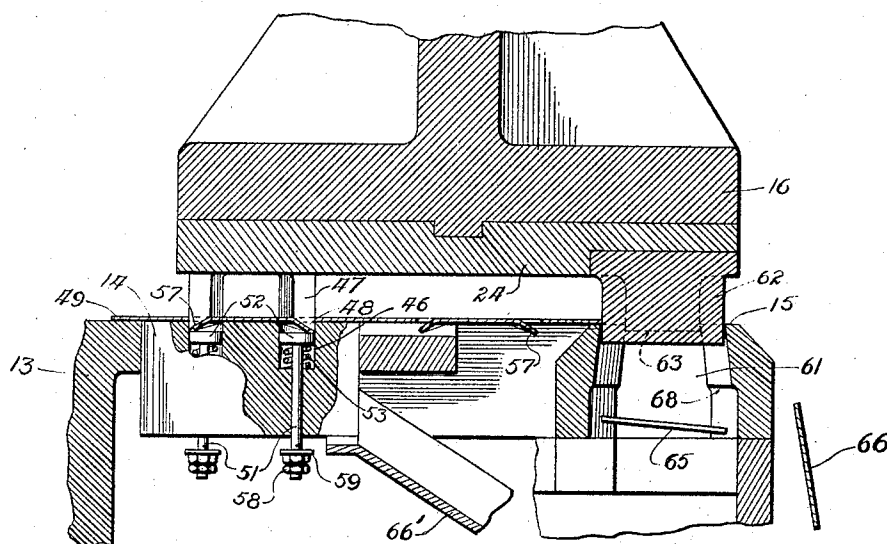
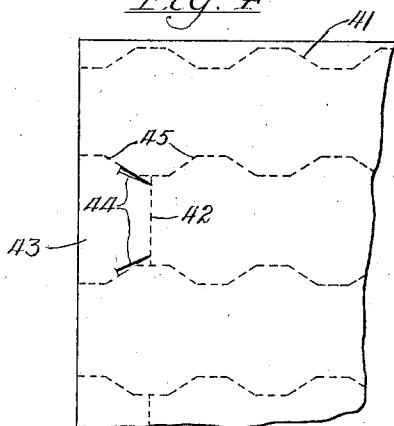


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN M. HOTHERSALL, OF BROOKLYN, NEW YORK, ASSIGNOR TO AMERICAN CAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

BLANK-SHEARING APPARATUS.

Application filed December 23, 1921. Serial No. 524,418.

To all whom it may concern:

Be it known that I, JOHN M. HOTHERSALL, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Blank-Shearing Apparatus, of which the following is a specification.

This invention relates in general to shearing machines and has more particular reference to an improvement in such machines whereby recovery pieces from the metal sheet being operated upon may be obtained in an efficient and rapid manner.

It is the present custom where automatic machinery is employed in the cutting of a number of articles from a sheet of tin plate, to first sever the sheet into strips by a shearing machine and subsequently to feed the strips so obtained through a press for the cutting of the desired articles. When the resultant article is of a circular configuration it is the common practice to cut such circular disks from adjacent rows of the tin plate in a staggered formation. This permits a more economical cutting of the sheet and provides a minimum amount of wastage. In order to make use of an automatic feed in connection with a press cutting the desired articles, it is usually necessary for the strip to contain one row of disk spaces. The strip is so formed as to accommodate the cutting of the round disks in staggered formation by being provided with a scroll or undulating edge which permits the same economy as if the disks were directly cut from the sheets in staggered relation.

In the cutting of this staggered strip it is found that spaces occur at the ends of the strip which are not sufficient in size to make a complete disk. It is desirable from the standpoint of economy, and is the customary practice when a condition of this kind occurs, to cut from the spaces left other smaller shapes known in the art as the recovery. The method usually employed for obtaining the final recovery consists in first removing the metal containing the recovery space from the strip and thence feeding the same into a recovery press where the final recovery is cut. To accomplish the removal of the metal strip, a transverse cut is made by a cutting edge offset from the face of and in a plane slightly beneath that of the

shearing die. By this method the transverse line across the end of the strip and the shearing line along the edge of the strip are cut at slightly different periods of time with the result that the recovery end is buckled and distorted. It has been found in practice that this distortion seriously interferes with the correct feeding and cutting of the recovery end in a recovery press, and it is toward a removal of this trouble that my present invention is directed.

My invention contemplates and has for a principal object the provision of an improved apparatus for removing the recovery ends of strips which are cut in a shearing machine by providing a primary slitting operation for notching the metal adjacent the transverse separating line, and using as a secondary and final cutting means the regular combination form of shearing and transverse cutting dies now in common use. The slitting mechanism is embodied within the shearing machine and prevents buckling of the metal containing the recovery space.

A further object of the invention is the provision of efficient means for disengaging the metal sheets from die members by which the slitting operation is performed so that they may be advanced to the shearing dies.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a vertical section through a shearing press in which my invention is embodied;

Fig. 2 is a plan view, partially in section, taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged detail section taken substantially on the line 3—3 in Fig. 2; and

Fig. 4 is a plan view of a portion of the metal sheet from which the blanks are formed, showing in outline the form of the strips to be cut and also the slits made in the advance operation.

Upon the drawings illustrating the invention, the reference numeral 11 indicates a body frame which is supported upon a base 12 and has mounted thereon a table 13 and die members 14 and 15 suitably secured thereto. A shearing die support 16 is

mounted for reciprocation in a frame yoke member 17, a dovetail connection indicated at 18 being provided between these parts. Intermittent reciprocation of the member 16 is accomplished by means of crossheads 19 mounted upon vertical rods 21 and secured to a horizontal rod 22 having bearings 23 protruding from a die plate 24 carried by the member 16. The rods 21 are actuated by eccentrics contained in brackets 25 and operated by a power shaft 26, said rods being secured to the actuating members at each end by nuts 27 and 28 respectively. The weight of the die support 16 is counterbalanced by springs 29 carried on rods 31 which are secured by nuts 32 and 33 to the frame yoke member 17. The springs are confined between end disks 34 on the rods 31 and a plate 35 through which said rods extend and which is secured by bolts 36 extending through a downturned extension 37 to a part 38 of the movable mounting for the die support 16.

The blanks are fed in any preferred manner over the table 13 and upon the stationary die parts 14 and 15. In order that the objects of the invention may be more fully understood, attention is directed to Fig. 4, in which the reference numeral 41 indicates generally the outline of the strips to be cut out, and the numeral 42 indicates the transverse line which is severed in removing the irregular end spaces 43 occurring, when the strips are formed as indicated, at opposite ends of alternate strips. In order to prevent buckling or distorting of the piece formed by the space 43 which normally is fed into another press for the removal of an article of different form from those obtained from the strips, slits 44 are made in the metal adjacent the transverse line 42 prior to the severance of the boundary line 45 by the shearing die.

The die member 14 is provided with recesses 46 into which the metal is adapted to be pressed by dies 47 having beveled points 48 which pierce the metal sheet 49 to form the slits 44. Extending through the lower die 14 are ejector rods 51 having disks 52 secured to their upper ends and being surrounded by springs 53 seated in the recesses 46 and confined beneath the disks 52. The rods 51 are slidable in the die member 14 and are forced downwardly by the dies 47 on their active stroke. Upon removal of the pressure of said dies, bent under portions 57 of the sheets 49 are forced upwardly through the action of the springs 53 and thus the sheet is disengaged from the recesses 46 and is free to be moved to the next station. Secured on the lower ends of the rod 51 are nuts 58 and washers 59 adapted to limit upward movement of said rods.

The lower die member 15 is provided with a long aperture 61 of the scroll or undulating

form desired in the strips, and an active die member 62 is secured in the die plate 24 and is of similar configuration, being adapted to co-operate with the die member 15 to cut out the strips in the aperture 61. It will be noted that the die 62 is provided with a transverse edge 63, which is adapted to sever the line 42 in the blank sheet, and in the lower die member are bridges or transverse supports 64 adapted to co-operate with the die edge 63 in severing said line. Prior to this action the slits 44 will have been cut since the die 47 acts in an advance position, and these slits extend to a position abutting the line 42. In this manner undue strain on the corners of the space 43 which would otherwise result from the successive action of the dies 62 and the die edge 63, is prevented and said spaces 43 may be removed in even, flat condition so that they may subsequently be fed into a press without difficulty. Two strips, indicated by the reference numerals 65 and 66, are cut at one stroke of the die 62, the one falling through the aperture 61 and being directed by a chute 66' into a receptacle or trough 67, and the other falling directly into said receptacle over the side of the die member 15. The aperture 61 flares downwardly and is cut out at 68 to facilitate the dropping of the strip 65 therethrough, and it will be understood that the end pieces cut from the spaces 43 also fall through this aperture and into the receptacle 67 which is secured to the side of the frame 11.

The frame yoke members 17 are secured to the table by bolts 71 passing through extensions 72 of said members, and the upper movable parts are of unitary construction so that the successive die actions are accomplished simultaneously and by the same power means.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. Apparatus for cutting blanks from metal sheets in shape to have can ends and the like formed therefrom, comprising shearing dies for removing main blanks, said dies being provided with means for removing irregular portions of the sheets not usable for forming the articles to be formed from said main blanks, and dies operating in advance of said shearing dies for slitting the material of the sheets adjacent the lines of severance of said irregular portions.

2. Apparatus for cutting from metal sheets strips formed of rows of can end providing spaces, comprising shearing dies for severing said strips from the sheets and for removing irregular end spaces occurring at the ends of alternate strips, and dies acting in advance of said shearing dies for slitting the material of the sheets adjacent a transverse line of severance of said irregular end spaces.

3. Apparatus for cutting from metal sheet strips formed of rows of can end providing spaces, comprising shearing dies for severing said strips from the sheets and for removing irregular end spaces occurring at the ends of alternate strips, dies acting in advance of said shearing dies for slitting the material of the sheets adjacent a transverse line of severance of said irregular end spaces, and means for ejecting the slitted portions of the sheets from said last mentioned die parts to permit the advancing of the sheets to said shearing dies.

4. In apparatus for cutting scroll strips from metal sheets, the combination of strip shearing dies provided with means for removing irregular spaces occurring at the ends of alternate strips, and means acting in advance of said shearing dies for severing a portion of the sheet adjacent a line of severance of said irregular spaces.

5. In apparatus for cutting scroll strips from metal sheets, the combination of strip shearing dies provided with means for removing irregular spaces occurring at the ends of alternate strips, means acting in advance of said shearing dies for severing a portion of the sheet adjacent a line of severance of said irregular spaces, and spring means for disengaging the sheets from said last mentioned means.

6. Apparatus for cutting strips from metal sheets in shape to have can ends and

the like formed therefrom, comprising die members for shearing the strips from the sheets, said die members being provided with means for removing irregular spaces occurring at the ends of certain of said strips and piercing means acting in advance of said die members for slitting a portion of the sheet adjacent a line of severance to be cut in removing said irregular spaces.

7. Apparatus for cutting strips from metal sheets in shape to have can ends and the like formed therefrom, comprising die members for shearing the strips from the sheets, said die members being provided with means for removing irregular spaces occurring at the ends of certain of said strips, and piercing means acting in advance of said die members for slitting a portion of the sheet adjacent a line of severance to be cut in removing said irregular spaces, the slits thus formed being arranged to prevent buckling of the material in the action of said die member.

8. Blank shearing apparatus, comprising a press provided with dies for shearing strips in form from which can ends may be obtained with minimum wastage, and means acting in advance of said shearing dies for piercing a portion of sheet subjected to unusual strain in the action of said dies, thereby to prevent distortion of the metal.

9. Blank shearing apparatus, comprising a press provided with shearing dies adapted to cut strips of desired form and to remove by a transverse line of severance irregular portions occurring at the ends of certain strips, and piercing means acting in advance of said shearing dies for piercing the material of the sheets adjacent said transverse line of severance, said shearing dies being provided with a transverse support for the sheet beneath said transverse line.

JOHN M. HOTHERSALL.